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## Chapter 15

# Applying the Capability Approach in Health Economic

## Evaluations

### A Sufficient Solution

Paul Mark Mitchell, Tracy E. Roberts, Pelham M. Barton, and Joanna Coast

### 1. Introduction

Economic evaluation is an analytic approach used to weigh the costs and consequences of interventions competing for the same resources. It provides a systematic way of dealing with scarcity, a core economic concept meaning that there are an unlimited number of wants to provide within a finite amount of resources. In health care, scarcity plays an important role, with limits on how many doctors, nurses, hospitals, and interventions can be provided within available resources. Economic evaluations in health have evolved in the past half century to help achieve the aims of a health care system in an efficient manner. Specifying the aims of a health care system and determining the meaning of efficiency for each health care system, however, involve normative judgments that are likely to vary across jurisdictions and societies. Although the standard health economic evaluation approach focuses on an objective that aims to maximize population health, there is enduring debate as to the appropriateness of this objective. A new approach emerging as an alternative is the use of the capability approach, developed by Amartya Sen. In this chapter, we aim to show how economic evaluation in health has developed over time, and we discuss its core tenets and underlying assumptions. We then present a new way of conducting economic evaluation based on people's capabilities. We call this

alternative the sufficient capability approach and present an illustrative example of the approach. Although the work presented in this chapter has been primarily developed in the UK context, the potential application of the sufficient capability approach is not restricted to any jurisdiction.

## 2. Health Economics and Health Economic Evaluation: Overview

The study of the economics of health and health care has grown significantly in approximately the past 50 years, ever since Kenneth Arrow wrote his seminal paper on the welfare economics of medical care in 1963, setting out the need for a different approach in economic analysis when assessing the provision of health care.<sup>1</sup> Health economics has developed a number of unique methods for measuring the benefits of health interventions, which are, for the most part, focused on the quantification of health benefits from interventions.

The role of health economic evaluations in aiding decision-making has grown significantly in approximately the past 15 years, with increasing application of economic evaluations in developing countries as well.<sup>2</sup> This can be partly attributed to the foundation of the English advisory body for health guidance, the National Institute for Health and Care Excellence (NICE), in 1999. Since then, NICE has stipulated the requirement for economic evaluations for selected new interventions to be conducted

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<sup>1</sup> Kenneth J. Arrow, “Uncertainty and the Welfare Economics of Medical Care,” *American Economic Review* 53, no. 5 (1963): 941–973.

<sup>2</sup> Peter J. Neumann et al., “The Changing Face of the Cost-Utility Literature, 1990–2012,” *Value in Health* 18, no. 2 (2015): 271–277.

before they can be recommended for use within the National Health Service.<sup>3</sup> This requirement has led to a significant increase in the use of economic evaluations within the United Kingdom, and the use of health economic evaluations is increasing globally also.<sup>4</sup>

## 2.1. Theories Underpinning Health Economic Evaluation

### 2.1.1. Welfarism

Alongside the numerous definitions used to define economics, welfarism is a term that has many interpretations, and it has hence been applied in a variety of ways. When referring to welfarism, welfarist, or welfare economics, we mean the interpretation as noted by Sen as a focus on individual utilities only, in terms of desire and satisfaction based on people's preferences.<sup>5</sup> Welfare economics is the standard theoretical framework in areas such as environmental economics and transport economics,<sup>6</sup> and it is the theoretical basis for the majority of economic evaluations applied in public policy by the UK government.<sup>7</sup>

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<sup>3</sup> NICE, *Developing NICE Guidelines: The Manual* (London: National Institute for Health and Care Excellence, 2014).

<sup>4</sup> Neumann et al. "The Changing Face."

<sup>5</sup> Amartya Sen, *Inequality Reexamined* (Oxford: Oxford University Press, 1992), 12–30.

<sup>6</sup> See, for example, Nick Hanley and Edward B. Barbier, *Pricing Nature: Cost–Benefit Analysis and Environmental Policy* (Cheltenham, UK: Elgar 2009); Kenneth Button, *Recent Development in Transport Economics* (Cheltenham, UK: Elgar, 2003).

<sup>7</sup> HM Treasury, *The Green Book: Appraisal and Evaluation in Central Government* (London: The Stationary Office, 2003).

There are four key principles on which welfarism attempts to achieve economic efficiency.<sup>8</sup> The first principle is known as *utilitarianism*. Utilitarianism assumes that each individual in society is a rational agent. Under utilitarianism, individuals order their options so that they achieve their optimum or highest possible level of utility or preferences.

The second principle of welfarism is *individualism*. Under individualism, individuals themselves are thought to be the best judges of how to maximize their utility, with a laissez-faire approach from the state that permits utility maximization by individuals.

*Consequentialism* is the third principle. Under consequentialism, the outcome of choices made by individuals is the only consideration for assessing their goodness. The means by which the ends or outcomes are reached are deemed irrelevant.

The final principle is *welfarism*. Welfarism can be defined in many different ways, but the principal tenet of welfarism is concerned with the judgment that the goodness of states be based only on the aggregation of individual utility.

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<sup>8</sup> Four principles of welfarism are drawn from Jeremiah Hurley, “Welfarism, Extra-welfarism and Evaluative Economic Analysis,” in *Health, Healthcare and Health Economics: Perspectives on Distribution*, ed. Morris L. Barer, Thomas E. Getzen, and Greg L. Stoddart (Chichester, UK: Wiley, 1998), 373–395; Jeremiah Hurley, “An Overview of the Normative Economics of the Health Sector,” in *Handbook of Health Economics Vol. 1, Part A*, ed. Anthony J. Culyer and Joseph P. Newhouse (Oxford: North-Holland, 2000), 55–118.

The main type of economic evaluation arising from the theoretical basis of welfare economics is cost–benefit analysis (CBA). The main aim of CBA is to compare interventions by valuing the costs and benefits of different interventions or treatments, usually in monetary terms.<sup>9</sup> CBA plays a major role in aiding decision-making in areas concerning transport and other areas across the public sector, such as environment and education projects.<sup>10</sup> The use of CBA in health care, however, remains somewhat on the periphery of decision-making, due at least in part to the difficulty attached to the direct monetary valuation of a life.<sup>11,12</sup>

CBA focuses on allocative efficiency—that is, the overall impact of a project across the society in which resources are being allocated. This means that when CBA is applied within the health service, all health and non-health-related costs and benefits are, in welfarist theory, accounted for within monetary outcomes known as willingness to pay (WTP). Assuming costs are the same for providing different interventions, the option that produces the highest net benefit, judged by how much people are willing to pay for

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<sup>9</sup> Michael F. Drummond et al., *Methods for the Economic Evaluation of Health Care Programmes* (Oxford: Oxford University Press, 2005), 211–214.

<sup>10</sup> Amiram Gafni, “Economic Evaluation of Health-Care Programmes: Is CEA Better Than CBA?” *Environmental & Resource Economics* 34, no. 3. (2006): 407–418.

<sup>11</sup> Joanna Coast, “Is Economic Evaluation in Touch with Society’s Health Values,” *British Medical Journal* 329, no. 7476 (2004): 1234.

<sup>12</sup> For recent developments in CBA for health, see Emma McIntosh et al., *Applied Methods of Cost–Benefit Analysis in Health Care* (Oxford: Oxford University Press, 2010).

different interventions, is the option that produces the optimal allocation. Allocative efficiency allows for comparison of welfare across multiple interventions for different population groups.<sup>13</sup> Practical examples of allocative efficiency studies linked with the CBA framework within health care include comparing helicopter ambulance services, heart operations and hip replacements,<sup>14</sup> and mental health care compared to cancer and elderly care.<sup>15</sup>

A major issue with the application of CBA within a health care setting is the monetary valuation of the benefits of health improvements to human life, thereby directly or indirectly leading to a monetary value on a human life.<sup>16</sup> However, many economists believe it is the best way of evaluating outcomes because it is grounded within welfare economic theory, the predominant theory of economic practice. New methods of valuing

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<sup>13</sup> Stephen Palmer and David J. Torgerson, "Definitions of Efficiency," *British Medical Journal* 318, no. 7191 (1999): 1136.

<sup>14</sup> Jan A. Olsen and Cam Donaldson, "Helicopters, Hearts and Hips: Using Willingness to Pay to Set Priorities for Public Sector Health Care Programmes," *Social Science & Medicine* 46, no. 1 (1998): 1–12.

<sup>15</sup> Eamon O'Shea, Brenda Gannon, and Brendan Kennelly, "Eliciting Preferences for Resource Allocation in Mental Health Care in Ireland," *Health Policy* 88, no. 2–3 (2008): 359–370.

<sup>16</sup> James C. Robinson, "Philosophical Origins of the Economic Valuation of Life," *Milbank Quarterly* 64, no. 1 (1986): 133–155.

improvements in health in monetary terms continue to be made to further develop this type of evaluation for health care.<sup>17</sup>

### 2.1.2. Extra-welfarism

The application of the normative theoretical framework of welfarism to a health care setting is controversial because there are a number of principles in welfarism that arguably conflict with the nature of health care. The principle underlying welfarism that has been most strongly challenged within health economics is that of utilitarianism—that is, relying solely on utility information to judge individual well-being. The theoretical critique of welfarism for use in health care has been drawn primarily from the critique of utility as a basis for assessing societal welfare by Amartya Sen.<sup>18</sup> In his critique of welfare economics, Sen referred to capturing additional information beyond individual utility as extra-welfarist. From this critique, and from Culyer's subsequent developments in the health context,<sup>19</sup> the term extra-welfarist has become associated with the health economics alternative to welfarism.

Brouwer and colleagues identified four ways in which extra-welfarism can be distinguished from welfare economic theory.<sup>20</sup> First, extra-welfarism permits the use of

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<sup>17</sup> McIntosh et al., *Applied Methods*.

<sup>18</sup> Amartya Sen, "Social Choice Theory: A Re-examination," *Econometrica* 45, no. 1 (1977): 53–89.

<sup>19</sup> Anthony J. Culyer, "The Normative Economics of Health Care Finance and Provision," *Oxford Review of Economic Policy* 5, no. 1 (1989): 34–58.

<sup>20</sup> Werner B. F. Brouwer et al., "Welfarism vs. Extra-welfarism," *Journal of Health Economics* 27, no. 2 (2008): 325–338.



non-utility outcomes. Given that the focus in the health care sector is on improving health, Brouwer and colleagues argue that a sole focus on utility is too narrow for health analysis and in theory attempts to complement utility with non-utility information. The primary normative framework for extra-welfarism in health economics is mainly based on incorporating information beyond utility into outcome measurement for health care provision, although in practice the focus is on health status,<sup>21</sup> such as the quality-adjusted life-year (QALY), a composite measure of health and duration (see Section 3).

Second, extra-welfarism allows for the valuation of outcomes from those not directly affected by the outcome of interest. Within extra-welfarism, a number of different population groups could be considered relevant for valuing outcomes and not, as within the welfarist tradition, just the individuals directly affected. Such alternative values can be appropriate within state provision of health care. For example, where the general population is funding the treatment of those who receive treatment, it could be argued that they are stakeholders in the benefit obtained from such interventions and should be involved in the valuation of outcomes.<sup>22</sup>

Third, Brouwer and colleagues consider extra-welfarism to be different from welfarism because it allows the weighting of outcomes to be based on factors other than individual preferences. For example, different weights could be applied based on sociodemographic characteristics of the individuals receiving the intervention, or

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<sup>21</sup> Culyer, “The Normative Economics,” 34–58.

<sup>22</sup> Marthe R. Gold et al., *Cost-Effectiveness in Health and Medicine* (Oxford: Oxford University Press, 1996), 1–303.

additional weight could be added if priority was advocated for a particular patient group (e.g., children).

Finally, extra-welfarism is different from welfarism because it permits interpersonal comparison in a number of dimensions of well-being. This means that, for example, this framework allows comparisons between the health (or well-being) of different people.

Although it has been argued that there are a number of differences between the extra-welfarist and welfarist frameworks, a number of similarities in the applications of the two theories remain. The objective within the extra-welfarist framework remains consequential in evaluation, in terms of maximization, mirroring the same form of consequentialism as applied in welfarism. The only difference is what is maximized, with the maximization of utility in welfarism replaced with the maximization of health in extra-welfarism.<sup>23</sup> Whereas the extra-welfarist framework argues for the multidimensionality of outcomes to be accounted for within evaluation, the practical application of extra-welfarism focuses on a single dimension—that is, health status.<sup>24</sup> This is particularly true within the extra-welfarist theoretical framework currently applied within health economics, in which the objective of the maximization of health using health-related outcomes is the primary objective of interest.<sup>25</sup>

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<sup>23</sup> Jeremiah Hurley, “Welfarism, Extra-welfarism,” 373–395.

<sup>24</sup> Jeremiah Hurley, “Welfarism, Extra-welfarism,” 373–395; Joanna Coast, Richard D. Smith, and Paula Lorgelly, “Welfarism, Extra-welfarism and Capability: The Spread of Ideas in Health Economics,” *Social Science & Medicine* 67, no. 7 (2008): 1190–1198.

<sup>25</sup> Anthony J. Culyer, “The Normative Economics,” 34–58.

Cost–utility analysis (CUA) is a type of economic evaluation that focuses attention particularly on health-related outcomes for health care treatments (note that the terminology here is at odds with the nature of the analysis).<sup>26</sup> CUA is the main evaluation framework of the extra-welfarist theory for health care as developed by Culyer. Culyer believed that the maximand (what is to be maximized) for evaluation conducted under extra-welfarism should be health.<sup>27</sup> Although utility is referred to within the title of CUA, it is not utility as is commonly interpreted within welfare economics. Measures of generic health-related quality of life (HRQoL) rely on preferences of individuals to value a generic health state in comparison to the anchors of full health and a state equivalent to being dead.<sup>28</sup> The index scores generated from HRQoL questionnaires are then combined with length of time to form a QALY, which is used as the outcome of benefit from economic evaluation and provides the reference case outcome measure for NICE evaluations.<sup>29</sup>

The CUA evaluation framework requires a consistent HRQoL outcome measure to be applied across all interventions evaluated so that decisions can be made that address not only technical efficiency between treatment options for the same health condition but also allocative efficiency across interventions so that funding can be justified in

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<sup>26</sup> Drummond et al., *Economic Evaluation*, 137–139.

<sup>27</sup> Anthony J. Culyer, “The Normative Economics,” 54–55.

<sup>28</sup> Paul Dolan et al., *A Social Tariff for EuroQol: Results from a UK General Population Survey* (York, UK: Centre for Health Economics, 1995).

<sup>29</sup> NICE, *Developing NICE Guidelines*, 123.

comparison with any other treatment across the health service.<sup>30</sup> This is of particular importance in a publicly funded health care system in which decisions should ensure that resources are appropriately allocated to different areas of the health service so that taxpayers are getting value for money.<sup>31</sup>

### 3. Extra-welfarism in Practice

The extra-welfarist framework has become synonymous with one health outcome measure in particular: the quality-adjusted life-year. The QALY as it was defined first in 1977<sup>32</sup> has changed relatively little over time.<sup>33</sup> The QALY takes account of quality of life in terms of both health (quality or Q) and length of life (i.e., life-years or LY). The quality part of the QALY is measured on a scale with the common anchoring of full health anchored to 1 and health states equivalent to being dead anchored to 0.<sup>34</sup> The quality part of the QALY is collected over time and combined with time spent in each health state to measure QALYs, where 1 QALY is equivalent to 1 year in full health. When applied to patient populations, the QALY seeks to find the additional health benefit

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<sup>30</sup> Palmer and Torgerson, “Definitions of Efficiency,” 1136.

<sup>31</sup> Karen Gerard, “Setting Priorities in the New NHS: Can Purchasers Use Cost–Utility Information,” *Health Policy* 25, no. 1–2 (1993): 109–125.

<sup>32</sup> Milton C. Weinstein and William B. Stason, “Foundations of Cost-Effectiveness Analysis for Health and Medical Practices,” *New England Journal of Medicine* 296, no. 3 (1977): 716–721.

<sup>33</sup> F. Reed Johnson, “Moving the QALY Forward or Just Stuck in Traffic?” *Value in Health* 12, no. s1 (2009): 38–39.

<sup>34</sup> Drummond et al., *Economic Evaluation*, 14.

of receiving a new treatment in comparison to an alternative by measuring the change in quality and quantity of life if a new treatment were introduced.<sup>35</sup>

To determine the quality part of the QALY, two questions need to be answered: What attributes of quality need to be valued? and How are these attributes to be valued?<sup>36</sup> Both of these are addressed next.

### 3.1. What Attributes to Value?

To calculate what is to be valued in the QALY, a generic measure of health status is usually collected from patients. The main method recommended by NICE for measuring quality for QALYs is the EuroQol (EQ-5D).<sup>37</sup> The EQ-5D is a five-item questionnaire of health status that assesses mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.<sup>38</sup> The dimensions on the EQ-5D were originally developed on three levels (no problems, some problems, and a lot of problems on a given dimension). The EQ-5D has been expanded to a five-level version, the EQ-5D-5L.<sup>39</sup>

### 3.2. How Are the Attributes Valued?

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<sup>35</sup> Milton C. Weinstein, George Torrance, and Alistair McGuire, “QALYs: The Basics,” *Value in Health* 12, no. s1 (2009): 5–9.

<sup>36</sup> Paul Dolan et al., “Valuing Health Directly,” *British Medical Journal* 339 (2009): b2577.

<sup>37</sup> NICE, *Developing NICE Guidelines*, 123.

<sup>38</sup> Richard Brooks, “EuroQol: The Current State of Play,” *Health Policy* 37, no. 1 (1996): 53–72.

<sup>39</sup> Michael Herdman et al., “Development and Preliminary Testing of the New Five-Level Version of EQ-5D (EQ-5D-5L),” *Quality of Life Research* 20, no. 10 (2011): 1727–1736.

Generic health status instruments need to be valued. NICE stipulates that the method for valuing between different health states must be choice based.<sup>40</sup> Thus, rating scales of health such as the EuroQol Visual Analogue Scale (EQ-VAS), a scale of 0 (worst health state imaginable) to 100 (best health state imaginable), cannot be used to value health states because respondents are not presented with a choice (i.e., preference of one health state over another) in the task. Preferences for health states are used to compare different interventions to represent a societal value of changes in health status.<sup>41</sup>

For the EQ-5D-3L, the values associated with each of the 245 possible health states (3<sup>5</sup> or 243 health states and 2 additional health states for “unconscious” and “dead”) were generated in the United Kingdom by Dolan from a representative sample of the general UK adult population.<sup>42</sup> These preferences were elicited using the time trade-off (TTO) technique developed by Torrance and colleagues to generate health preferences between quality and quantity of life. The TTO method asks participants how much quantity of life they are willing to trade off in a worse state of full health (i.e., <1) to improve their quality of life to its optimum level of full health.<sup>43</sup>

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<sup>40</sup> NICE, *Guide to the Methods of Technology Appraisal* (London: National Institute for Health and Care Excellence, 2013), 43.

<sup>41</sup> Drummond et al., *Economic Evaluation*, 143–147.

<sup>42</sup> Paul Dolan, “Modeling Valuations for EuroQol Health States,” *Medical Care* 35, no. 11 (1997): 1095–1108.

<sup>43</sup> George W. Torrance, Warren H. Thomas, and David L. Sackett, “A Utility Maximisation Model for Evaluation of Health Care Programs,” *Health Services Research* 7, no. 2 (1972): 118–133.

Once a health status questionnaire has been completed to give a profile of an individual for a given condition, values are then assigned to the patient profile to generate an index score for that state of being.<sup>44</sup> Index scores for individual health states can then be combined with the length of period a given individual spends within this health state to calculate the QALY. For example, an individual who scores an EQ-5D score of 0.5 and is in this health state for 1 year generates 0.5 QALY.

A number of alternatives to the QALY have been suggested within the health economics literature. The most well-known of these is the disability-adjusted life-year (DALY), which has been the measure of choice for assessing the global burden of disease by the World Health Organization (WHO) since the early 1990s.<sup>45</sup> The calculation of QALYs and that of DALYs are somewhat similar. However, the objective of maximizing health within the QALY approach is substituted in the DALY approach by minimizing disease burden through reducing DALYs lost. The DALY has been developed to assess population health primarily within developing countries, which is easier to measure where information on HRQoL may not be easily accessible. The DALY provides more information than mortality data alone. Relatively recently, new economic evaluation

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<sup>44</sup> Drummond et al., *Economic Evaluation*, 155–156.

<sup>45</sup> Christopher Murray and Alan Lopez, *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries and Risk Factors in 1990 and Projected to 2020* (Cambridge, MA: Harvard University Press, 1996).

guidelines have been developed to improve the reporting of economic evaluations in developing countries.<sup>46</sup>

### 3.3. Decision Rules

A number of decision rules can, in theory, be used to aid health care decision-making. Decision rules are generally based on aiding decision-making as to whether new interventions are worth the additional cost burden to the funding or implementing body in question (e.g., hospital and regional or national provision). For NICE, QALY scores are aggregated for the population under consideration, with the costs and benefits combined by calculating a cost-effectiveness ratio or cost per QALY gained. To compare differences between costs and effects for competing interventions, the incremental cost-effectiveness ratio (ICER) is applied to measure the cost per additional QALY gained for the more expensive and/or effective treatments.<sup>47</sup> The ICER for a given treatment is then compared with a shadow price for the budget of interest. This is known as the threshold ICER rule. For new interventions to be recommended by NICE, the willingness to pay for an additional QALY must fall within or below the threshold range of £20,000–£30,000. However, in exceptional circumstances, the willingness to pay for QALY gains is sometimes raised above the £30,000 threshold.<sup>48</sup> A recent study suggested that 82% of NICE decisions can be predicted by the prevailing threshold ICER rule of less than

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<sup>46</sup> Karl Claxton et al., *The Gates Reference Case for Economic Evaluation* (Seattle, WA: The Bill and Melinda Gates Foundation, 2014).

<sup>47</sup> Michael F. Drummond et al., *Economic Evaluation*, 40.

<sup>48</sup> NICE, *Developing NICE Guidelines*, 146.



£30,000 per QALY gain.<sup>49</sup> However, a number of health economists have argued that the NICE threshold is too high and should instead be set at £13,000 per QALY gain.<sup>50</sup>

Another alternative for decision-making using these ICERs is the “QALY league table,” in which interventions with the lowest ICERs are recommended until no more resources are available.<sup>51</sup> This approach has been previously applied within the United States.<sup>52</sup> However, the league table approach came under heavy scrutiny,<sup>53</sup> which led to the ICER threshold rule as the current dominant method for comparing interventions in health economics. The aim of both approaches, however, is to maximize QALY gains for the scarce resources available, irrespective of distributional concerns.

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<sup>49</sup> Helen Dakin et al., “The Influence of Cost-Effectiveness and Other Factors on NICE Decisions,” *Health Economics* 24, no.10 (2015), 1256-1271.

<sup>50</sup> Karl Claxton et al., “Methods for the Estimation of the National Institute for Health and Care Excellence Cost-Effectiveness Threshold,” *Health Technology Assessment* 19, no. 14 (2015): 73–78.

<sup>51</sup> Stephen Birch and Ariman Gafni, “Decision Rules in Economic Evaluation,” in *The Elgar Companion to Health Economics*, ed. Andrew Jones (Cheltenham, UK: Elgar, 2006), 492–502.

<sup>52</sup> David C. Hadorn, “Setting Health Care Priorities in Oregon: Cost-Effectiveness Meets the Rule of Rescue,” *JAMA* 216, no. 17 (1991): 2218–2225.

<sup>53</sup> For example, see Michael Drummond, George Torrance, and James Mason, “Cost-Effectiveness League Tables: More Harm Than Good?” *Social Science & Medicine* 37, no. 1 (1993): 33–40; Karen Gerard and Gavin Mooney, “QALY League Tables: Handle with Care,” *Health Economics* 2, no. 1 (1993): 59–64.

## 4. Critiquing the QALY

The QALY has faced a number of criticisms since it was developed concerning both the theoretical assumptions underpinning the outcome measure<sup>54</sup> and the considerations that are overlooked within the measure.<sup>55</sup>

There are a number of theoretical arguments against the use of the QALY outcome for measuring the benefits from health interventions. One such argument is the focus on changes in individual health status only, rather than a more holistic measure of individual welfare that would capture the broader benefits to individual well-being from health care. The health QALY also limits the generalizability to compare the benefits to society with other public interventions, such as education, justice, and transport. Even if it accepted that health maximization is an intuitive objective for health services, there are many practical examples concerning social care,<sup>56</sup> end-of-life care,<sup>57</sup> process of care,<sup>58</sup>

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<sup>54</sup> For example, see Roy A. Carr-Hill, “Assumptions of the QALY Procedure,” *Social Science & Medicine* 29, no. 3 (1989): 469–477; Graham Loomes and Lynda McKenzie, “The Use of QALYs in Health Care Decision Making,” *Social Science & Medicine* 29, no. 3 (1989): 299–308.

<sup>55</sup> Erik Nord, *Cost–Value Analysis in Health Care: Making Sense Out of QALYs* (Cambridge, UK: Cambridge University Press, 1999).

<sup>56</sup> Hareth Al-Janabi, Terry N. Flynn, and Joanna Coast, “QALYs and Carers,” *Pharmacoeconomics* 29, no. 12 (2011): 1015–1023.

<sup>57</sup> Charles Normand, “Measuring Outcomes in Palliative Care: Limitations of QALYs and the Road to PaLYs,” *Journal of Pain and Symptom Management* 38, no. 1 (2009): 27–31.

and complex interventions<sup>59</sup> in which QALY maximization proves problematic. Indeed, there is doubt as to how much the objective of QALY maximization is reflective of societal values.<sup>60</sup>

An alternative proposal to the welfarist (through WTP) and extra-welfarist (through HRQoL and QALYs) approaches to measuring benefits is the capability approach. The capability approach, developed originally by Amartya Sen,<sup>61</sup> is a prominent critique of standard welfare economic theory. Sen argues that standard welfare economic theory is used to evaluate societal well-being through a narrow focus on a person's utility levels.

The first attempt following Culyer to incorporate the capability approach within a health economic evaluation format was by Cookson, although it has been previously

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<sup>58</sup> Victoria K. Brennan and Simon Dixon, "Incorporating Process Utility into Quality Adjusted Life Years: A Systematic Review of Empirical Studies," *Pharmacoeconomics* 31, no. 8 (2013): 677–691.

<sup>59</sup> Katherine Payne, Marion McAllister, and Linda M. Davies, "Valuing the Economic Benefits of Complex Interventions: When Maximising Health Is Not Sufficient," *Health Economics* 22, no. 3 (2013): 258–271.

<sup>60</sup> Paul Dolan et al., "QALY Maximisation and People's Preferences: A Methodological Review of the Literature," *Health Economics* 14, no. 2 (2005): 197–208.

<sup>61</sup> Although there are numerous writings by Sen on the capability approach, see Amartya Sen, *The Idea of Justice* (London: Lane, 2009); see also chapters in this volume by Fourie (Chapter 10) and Ram-Tiklin (Chapter 8) for more detailed discussion on the theory underpinning the capability approach.

suggested as an alternative to HRQoL measures. Cookson and, recently, Bleichrodt and Quiggin have argued for a formulation of QALYs as a measure that reflects the capability approach.<sup>62</sup> However, others have argued that the objectives of maximizing health and measuring “more than health” are key rationales for moving away from the current QALY approach in health economics.<sup>63</sup> Specific areas in which health care resources are allocated that have argued for a broader assessment than health include social care,<sup>64</sup> public health,<sup>65</sup> mental health,<sup>66</sup> palliative care,<sup>67</sup> and chronic pain.<sup>68</sup>

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<sup>62</sup> Richard Cookson, “QALYs and the Capability Approach,” *Health Economics* 14, no. 8 (2005): 817–829; Han Bleichrodt and John Quiggin, “Capabilities as Menus: A Non-welfarist Basis for QALY Evaluation,” *Journal of Health Economics* 32, no. 1 (2013): 128–137.

<sup>63</sup> Paul Anand, “Capabilities and Health,” *Journal of Medical Ethics* 31 (2005): 299–303; Joanna Coast, Richard Smith, and Paula Lorgelly, “Should the Capability Approach Be Applied in Health Economics?” *Health Economics* 17, no. 6 (2008): 667–670.

<sup>64</sup> Ini Grewal et al., “Developing Attributes for a Generic Quality of Life Instrument for Older People: Preferences or Capabilities?” *Social Science and Medicine* 62, no. 8 (2006): 1891–1901; Ann Netten et al., “Outcome of Social Care for Adults: Developing a Preference Weighted Measure,” *Health Technology Assessment* 16, no. 16 (2012): 1–166.

<sup>65</sup> Paula Lorgelly et al., “Outcome Measurement in Economic Evaluation of Public Health Interventions: A Role for the Capability Approach?” *International Journal of Environmental Research and Public Health* 7, no. 5 (2010): 2274–2289.

The use of the capability approach directly in the health economics field has so far largely focused on the development of capability questionnaires (Table 15.1).<sup>69</sup> Indeed, capability measures have been recommended for use in social care interventions in the most recent NICE economic evaluation reference case.<sup>70</sup> Less progress has been made with regard to how such questionnaires, once fully developed and validated, can or should be used within an economic evaluation framework to aid priority-setting in health care for advisory bodies such as NICE.

[INSERT TABLE 15.1 HERE]

## 5. The Capability Approach as an Alternative Theoretical Basis for Economic Evaluation

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<sup>66</sup> Judit Simon et al., “Operationalising the Capability Approach for Outcome Measurement in Mental Health Research,” *Social Science & Medicine* 98 (2013): 187–196.

<sup>67</sup> Joanna Coast, “Strategies for the Economic Evaluation of End-of-Life Care: Making a Case for the Capability Approach,” *Expert Review of Pharmacoeconomics & Outcomes Research* 14, no. 4 (2014): 473–482.

<sup>68</sup> Philip Kinghorn, Angela Robinson, and Richard D. Smith, “Developing a Capability-Based Questionnaire for Assessing Well-Being in Patients with Chronic Pain,” *Social Indicators Research* 120, no. 3 (2015): 897–916.

<sup>69</sup> For more details on these capability measures, see Joanna Coast, Philip Kinghorn, and Paul Mitchell, “The Development of Capability Measures in Health Economics: Opportunities, Challenges and Progress,” *The Patient* 8, no. 2 (2015): 119–126.

<sup>70</sup> NICE, *Developing NICE Guidelines*, 123.

The capability approach, most prominently developed by Amartya Sen and philosopher Martha Nussbaum, is an alternative theory of assessing individual's advantage compared to the utilitarian tradition in welfare economics.<sup>71</sup> The capability perspective has been identified by a number of researchers in the health field as a promising alternative,<sup>72</sup> with some researchers conceptualizing the approach to health in particular.<sup>73</sup> However, one of the difficulties with the capability approach is its underspecified nature (e.g., there is no explicit capability list appropriate for all policy decisions or common objective in

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<sup>71</sup> For the most current accounts of the capability approach, see Sen, *The Idea*; and Martha C. Nussbaum, *Creating Capabilities: The Human Development Approach* (London: Belknap, 2011).

<sup>72</sup> M. A. Verkerk, J. J. V. Busschbach, and E. D. Karssing, "Health-Related Quality of Life Research and the Capability Approach of Amartya Sen," *Quality of Life Research* 10, no. 1 (2001): 49–55; Anand, "Capabilities and Health," 299–303; Coast et al., "Should the Capability," 667–670; Iain Law and Heather Widdows, "Conceptualising Health: Insights from the Capability Approach," *Health Care Analysis* 16, no. 4 (2008): 303–314; Vikki A. Entwistle and Ian S. Watt, "Treating Patients as Persons: A Capabilities Approach to Support Delivery of Person-Centred Care," *American Journal of Bioethics* 13, no. 8 (2013): 29–39.

<sup>73</sup> Jennifer Prah Ruger, *Health and Social Justice* (Oxford: Oxford University Press, 2010); Sridhar Venkatapuram, *Health Justice: An Argument from the Capabilities Approach* (Cambridge, UK: Polity, 2011).

capability evaluations).<sup>74</sup> Although also viewed as an advantage in that the approach can be adapted to address particular policy concerns, this poses a challenge in offering a coherent practical application of the capability approach as an alternative, for example, to the current methods of economic evaluation in health care. Indeed, the capability approach has been used to justify a move away from traditional welfare economic practice toward extra-welfarist QALYs and DALYs. However, both QALYs and DALYs are primarily concerned with health as opposed to capability more generally.<sup>75</sup>

A literature review of health studies attempting to measure capability found that none of the studies focused on health status alone to capture capability.<sup>76</sup> The review of capability applications also found that although there is no consensus in the objective of capability-based evaluations, a large proportion of studies were concerned with an objective related to sufficiency of capabilities. Predominantly, this is due to the application of the capability approach in developing countries and the need to alleviate the insufficiency of basic capabilities in these impoverished scenarios. Following from

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<sup>74</sup> Robert Sugden, “Welfare, Resources and Capabilities: A Review of *Inequality Reexamined* by Amartya Sen,” *Journal of Economic Literature* 31, no. 4 (1993): 1947–1962.

<sup>75</sup> Michael Drummond et al., “Towards a Consensus on the QALY,” *Value in Health* 12, no. s1 (2009): 31–35; Erik Nord, “Disability Weights in the Global Burden of Disease 2010: Unclear Meaning and Overstatement of International Agreement,” *Health Policy* 111, no. 1 (2013): 99–104.

<sup>76</sup> Paul M. Mitchell et al., “Applications of the capability approach in the health field: a literature review,” *Social Indicators Research*, in press.

this, research has led to the development of methods for generating capability outcomes reflective of the findings from the literature review of the objective of sufficiency of capabilities.

## 5.1. Sufficient Capability Outcomes

Drawing on methodology from the multidimensional poverty literature, which also draws its theoretical basis from the capability perspective,<sup>77</sup> and health economic outcomes, we developed a methodology for calculating a composite measure of sufficient capability and time.<sup>78</sup> Multidimensional poverty measurement is based on capturing multiple deprivations beyond income, and the approach uses a capability perspective to allow for a richer evaluative space on deprivation through a multidimensional lens. Using an example from the United States, Alkire and Foster demonstrate how focusing on income can give a distorted view of how poverty is portrayed within a community and who should be targeted by policy decisions.<sup>79</sup>

The approach developed by us is based on an outcome called years of sufficient capability (YSC). Instead of focusing on the absolute gains of capability across a population (i.e., capability maximization), the YSC targets those who fall below a

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<sup>77</sup> Sabina Alkire and James Foster, “Counting and Multidimensional Poverty Measurement,” *Journal of Public Economics* 95, no. 7–8 (2011): 476–487.

<sup>78</sup> Paul M. Mitchell et al., “Assessing Sufficient Capability: A New Approach to Economic Evaluation,” *Social Science & Medicine* 139 (2015): 71–79..

<sup>79</sup> Alkire and Foster, “Counting and Multidimensional,” 483–484.



threshold level of sufficient capability, with the aim being to improve capability to sufficient levels for those who are “capability poor.”<sup>80</sup>

To demonstrate the use of YSC, we use a newly developed capability index for the general adult UK population, the ICEpop (Investigating Choice Experiments for the Preferences of Older People) CAPability measure for Adults (ICECAP-A).<sup>81</sup> The ICECAP-A research team conducted qualitative research with members of the UK population to identify the most important capabilities for adults aged 18 years or older. Through thematic analysis of semistructured interviews with the UK general population, Al-Janabi and colleagues found five capabilities of most importance:

Stability—“ability to feel settled and secure”

Attachment—“an ability to have love, friendship, and support”

Autonomy—“an ability to be independent”

Achievement—“an ability to achieve and progress in life”

Enjoyment—“an ability to experience enjoyment and pleasure”

The ICECAP-A instrument was developed using these five attributes after an iterative process was used to test the understanding of questions, making sure that questions were interpreted in the same way as the original conceptual attributes developed. This resulted

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<sup>80</sup> Mitchell et al., “Assessing Sufficient Capability.”

<sup>81</sup> Hareth Al-Janabi, Terry N. Flynn, and Joanna Coast, “Development of a Self-Report Measure of Capability Wellbeing for Adults: The ICECAP-A,” *Quality of Life Research* 21, no. 1 (2012): 167–176; Terry N. Flynn et al., “Scoring the ICECAP-A Capability Instrument: Estimation of a UK Population Tariff,” *Health Economics* 24, no. 3 (2015): 258–269.

in five attributes of capability across four levels, ranging from no capability to full capability for each attribute (Table 15.2).<sup>82</sup> The focus on capability in the ICECAP-A offers an alternative method for measuring the impact of health interventions to measures focused on health status.

[INSERT TABLE 15.2 HERE]

Values for the ICECAP-A capability index were generated for a representative sample of the UK adult population through a method called best–worst scaling. Best–worst scaling presents scenarios to participants whereby, for the ICECAP-A, they are asked to state their most and least favored attribute from the five options presented to them (i.e., one from each attribute). For example, a person could be asked to choose the best and worst capability states when the ICECAP-A stability and attachment attributes are at their highest levels, autonomy is at the second highest level, and both achievement and enjoyment attributes are at their lowest levels. The best–worst scaling approach is favored by the ICECAP team due to the fact that this method of valuation does not necessarily rely on individual preferences because individuals are not directly asked to choose between two different scenarios.<sup>83</sup> Values are anchored on a no capability–full capability (0–1) scale.<sup>84</sup> To score 1, a person must have the highest levels of all ICECAP-A attributes. To score 0, a person would need to have the lowest levels on each of the ICECAP-A attributes.

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<sup>82</sup> Al-Janabi et al., “The ICECAP-A,” 167–176.

<sup>83</sup> Joanna Coast et al., “Valuing the ICECAP Capability Index for Older People,” *Social Science & Medicine* 67, no. 5 (2008): 874–882.

<sup>84</sup> Flynn et al., “Scoring the ICECAP-A,” 258–269.

Because the ICECAP-A is a relatively new measure, limited studies have assessed its validity in patient groups. However, in a general adult UK population sample, capability differences were found between health and socioeconomic groups, showing that it can distinguish between groups that can be considered disadvantaged.<sup>85</sup> The ICECAP-A has also been tested and has demonstrated reliability and face validity in the UK population.<sup>86</sup>

In [Table 15.2](#), we present the ICECAP-A questionnaire format and sufficient capability values, with sufficient capability thresholds set at “33333” and “22222” for illustration.<sup>87</sup> What this means in practice is that for someone to be classed as having sufficient capability for threshold “33333,” he or she needs to answer the questionnaire level 3 or higher for each attribute to be classed as having sufficient capability (e.g., level 3 for the ICECAP-A stability attribute would read, “I am able to feel settled and secure in many areas of my life”).<sup>88</sup>

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<sup>85</sup> Hareth Al-Janabi et al., “An Investigation of the Construct Validity of the ICECAP-A Capability Measure,” *Quality of Life Research* 22, no. 7 (2013): 1831–1840.

<sup>86</sup> Hareth Al-Janabi et al., “Test–Retest Reliability of Capability Measurement in the UK General Population,” *Health Economics* 24, no. 5 (2014): 625–630; Hareth Al-Janabi et al., “Can Capabilities Be Self-Reported? A Think Aloud Study,” *Social Science & Medicine* 87 (2013): 116–122.

<sup>87</sup> The original ICECAP-A valuation can be obtained from Flynn et al., “Scoring the ICECAP-A,” 265.

<sup>88</sup> For further details on the sufficient capability methodology, see Mitchell et al., “Assessing Sufficient Capability.”

### 5.2. Illustrative Example

A decision-maker has to decide which of two mutually exclusive interventions to provide. Both interventions cost \$1 million, and both treat 100 patients with similar sociodemographic characteristics. Intervention A is a medicine to improve a mild health problem and is clinically effective. Intervention B is an intervention that requires fewer hospital visits and stays for moderate health problems, although it has less clinical effectiveness than intervention A. The decision-maker is presented with information about health gain (arbitrarily estimated here for illustrative purposes to calculate a likely health state score on a measure such as EQ-5D), full capability gain, and sufficient capability gain. Intervention A improves the autonomy attribute on ICECAP-A by one level for 20 individuals previously at level 1 (i.e., from level 1 to level 2), 40 individuals previously at level 2, and 40 individuals previously at level 3. Intervention B improves the attachment attribute on ICECAP-A for 40 individuals previously at level 1, 40 individuals at level 2, and 20 individuals at level 3. Intervention A improves its population health by twice as much as intervention B. We assume that these gains are kept for 1 year following intervention. The results of this illustrative example are presented in [Table 15.3](#).

[INSERT TABLE 15.3 HERE]

The first matter to note is that in this example, we present a situation in which change in full and sufficient capability may differ from change in health status. Although this is unlikely to always be the case, this would be the first reason for considering moving from a focus on health status to capability because it may result in a change in how resources are allocated. The second matter is that in this example, all capability

outcomes point to intervention B. However, of most importance is the effect that focusing on sufficient capability could have on deciding what intervention to choose. Compared to considering full capability gain, using a threshold of “22222” means that improvements from level 1 to level 2 are valued much more highly, whereas improvements above level 2 are not valued at all. In the case of intervention B, the higher valuation of the gains from level 1 to level 2 outweighs the fact that the gains by the other 60 individuals are now valued at 0, so the valuation of the overall gain increases from 0.09 to 0.11. This contrasts with intervention A, in which only 20 individuals’ gains are valued more highly, whereas 80 individuals’ gains are not weighted at all, with the result that the valuation of the overall gain decreases from 0.06 to 0.04. Therefore, one can imagine a situation in which two interventions focusing on capability may give different results if the focus is on maximum capability gain across a population versus a focus on the improvement of capability below a sufficient threshold. This illustrative example shows the potential for developing an approach for implementing capability measures in a framework to aid decision-making linked to an objective of sufficient capability.

## 6. Discussion

In this chapter, we highlighted how a sufficient capability approach may lead to different decisions being made with regard to the provision of health care interventions. The development of capability measures and the lack of reliance on health status as a sole indicator of welfare in capability studies indicate a need to move beyond measures focused purely on a person’s health state when adopting a capability perspective. Although no clear consensus exists with regard to the objective of a capability-based

evaluation, we argue that, based on how most studies are applying the approach<sup>89</sup> and the need to offer a coherent alternative to welfare economic practice, there is appeal in some form of merging of ideas between concepts related to sufficiency and capability. We presented an example of how the use of the YSC outcome could lead to different decisions than those based on the current application of health QALY maximization.

A number of criticisms have been made of the QALY approach. Many of these criticisms concern people who may be considered to be disadvantaged by taking a singular approach to assessing all interventions. Most of these critiques have been based on claims to different groups, most notably those who are most severely ill<sup>90</sup> but also others.<sup>91</sup> For example, NICE has given additional weight to interventions that meet end-of-life criteria. Most tweaks to the QALY have been based on these claims, although health status has remained central within this calculation. Instead of tweaking the QALY, we argue that it is necessary to redesign the evaluative space to focus on individual capabilities.

There has been one notable attempt in the health economics literature to align economic evaluation with a sufficiency criterion. Alan Williams argued for “fair innings” for everyone so that once one reaches one’s “fair innings” of years lived (Williams argued this to be 70 years), priority should be shifted to those who have yet to reach their

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<sup>89</sup> Mitchell et al., “Applications of the capability approach.”

<sup>90</sup> Nord, *Cost–Value Analysis*.

<sup>91</sup> Dolan et al., “QALY Maximisation,” 197–208.

sufficient number of years alive.<sup>92</sup> Although we also adopt sufficiency principles, our approach is different. We suggest that interventions should be targeted at those who fall below a sufficient level of capability—the level of capability to live a life someone has reason to value—without making any further claims on who should be prioritized.

How to define a sufficient threshold of capability needs to be considered further. One approach would be to conduct qualitative research using participatory methods to assign a sufficient threshold for a given population.<sup>93</sup> Alternatively, quantitative research could be conducted to assign sufficient thresholds, similar to an approach taken in the poverty literature to assign “core poverty” thresholds.<sup>94</sup> Although we have argued for and justified the rationale for adopting a sufficient capability approach, the same methodology could, of course, be used to reach a sufficient level of health. Such an approach would require a similar justification as the one presented for sufficient capability. Here, however, our attention focuses on people’s capabilities more broadly and setting an objective that is reflective of practical capability studies.<sup>95</sup>

## Acknowledgments

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<sup>92</sup> Alan Williams, “Intergenerational Equity: An Exploration of the ‘Fair Innings’ Argument,” *Health Economics* 6, no. 2 (1997): 117–132.

<sup>93</sup> Joanna Coast, “The Appropriate Uses of Qualitative Methods in Health Economics,” *Health Economics* 8, no. 4 (1999): 345–353.

<sup>94</sup> David A. Clark and Mozaffar Qizilbash, “Core Poverty, Vagueness and Adaptation: A New Methodology and Some Results from South Africa,” *Journal of Development Studies* 44, no. 4 (2008): 519–544.

<sup>95</sup> Mitchell et al., “Applications of the capability approach.”

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Table 15.1

### Capability Measures Developed to Aid Health Decision-Making

First Author	Publication Year	Population	Targeted Interventions
Coast	2008	Older people	Health and social care
Lorgelly	2008	General adult	Public health
Anand	2009	General adult	Generic
Al-Janabi	2012	General adult	Generic
Netten	2012	Older people	Social care
Simon	2013	Mental health	Mental health
Ferrer	2014	Obese/diabetic	Physical activity and diet
Sutton	2014	End of life	Palliative care
Kinghorn	2015	Chronic pain	Chronic pain

Table 15.2

### ICECAP-A Questions and Values: Sufficient Capability Thresholds<sup>a</sup>

Attribute	“33333”	“22222”
<b>Stability</b>		
4 I am able to feel settled and secure in <i>all</i> areas of my life.	0.2255	0.2294
3 I am able to feel settled and secure in <i>many</i> areas of my life.	0.2255	0.2294
2 I am able to feel settled and secure in <i>a few</i> areas of my life.	0.1193	0.2294
1 I am <i>unable</i> to feel settled and secure in <i>any</i> areas of my life.	−0.0009	−0.0018
<b>Attachment</b>		
4 I can have <i>a lot</i> of love, friendship, and support.	0.2225	0.2183
3 I can have <i>quite a lot</i> of love, friendship, and support.	0.2225	0.2183



2	I can have <i>a little</i> love, friendship, and support.	0.1135	0.2183
1	I <i>cannot</i> have <i>any</i> love, friendship, and support.	−0.0281	−0.0541
<b>Autonomy</b>			
4	I am able to be <i>completely</i> independent.	0.1837	0.1894
3	I am able to be independent in <i>many</i> things.	0.1837	0.1894
2	I am able to be independent in <i>a few</i> things.	0.0984	0.1894
1	I am <i>unable</i> at all to be independent.	0.0074	0.0143
<b>Achievement</b>			
4	I can achieve and progress in <i>all</i> aspects of my life.	0.1870	0.2059
3	I can achieve and progress in <i>many</i> aspects of my life.	0.1870	0.2059
2	I can achieve and progress in <i>a few</i> aspects of my life.	0.1070	0.2059
1	I <i>cannot</i> achieve and progress in <i>any</i> aspects of my life.	0.0247	0.0476
<b>Enjoyment</b>			
4	I can have <i>a lot</i> of enjoyment and pleasure.	0.1813	0.1570
3	I can have <i>quite a lot</i> of enjoyment and pleasure.	0.1813	0.1570
2	I can have <i>a little</i> enjoyment and pleasure.	0.0816	0.1570
1	I <i>cannot</i> have <i>any</i> enjoyment and pleasure.	−0.0031	−0.0059

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<sup>a</sup>To see the original ICECAP-A questionnaire layout, see Al-Janabi, Hareth, Terry N. Flynn, and Joanna Coast, “Development of a Self-Report Measure of Capability Wellbeing for Adults: The ICECAP-A,” *Quality of Life Research* 21, no. 1 (2012): 167–176.

Table 15.3

### Comparing Health Gain, Capability Gain, and Sufficient Capability Outcomes<sup>a</sup>

Benefit	Treatment A	Treatment B
Health gain	<i>0.10</i>	0.05
Capability gain	0.06	<i>0.09</i>
Threshold “33333”	0.05	<i>0.10</i>
Threshold “22222”	0.04	<i>0.11</i>

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<sup>a</sup>Numbers in italics represent optimum strategy based on different objectives.